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Forest Pest Conditions Report for the Northeastern Area - 1988



1988

FOREST PEST CONDITIONS REPORT

FOR THE

NORTHEASTERN AREA - 1988

by

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SUMMARY OF MAJOR PESTS

INSECTS

Gypsy Moth

Gypsy moth populations increased areawide in 1988 and defoliation ranged from light to severe. Mortality is occurring in several areas. Suppression programs using Dimilin and B.t. (*Bacillus thuringiensis*) took place in several states with plans to continue these projects in 1989.

Spruce Budworm

Low, stable populations continue to be observed throughout the northeast and Lake states area. Mortality is occurring in some states but is considered to be caused by secondary organisms. A further decrease in populations is expected in 1989.

Pear Thrips

Pear thrips populations exploded in the northeast during 1988. Damage was heaviest in Massachusetts and Vermont where populations tripled since 1987. Some areas were completely defoliated. A governor's Technical Task Force on Pear Thrips was established to study the problem and plan strategies for 1989.

Oak Leaf tier

Some New England states observed heavy defoliation by oak leaf tier during 1988. Heavy populations in Massachusetts are being monitored and a Dimilin spray project is planned for 1989. New Hampshire populations increased and the same is expected in 1989.

Jack Pine Budworm

Populations continued to decline in the Lake states and this trend is expected to continue in 1989. Defoliation was light with some jack pine mortality occurring from past defoliation.

DISEASES

Anthracnose

Anthracnose damage to sycamores and dogwoods was severe in 1988. Defoliation was significant, some areas as high as 75 percent. Prolonged wet periods during bud break and summer drought increased anthracnose incidence.

Beech Bark Disease

Mortality and dieback due to beech bark disease continues to occur throughout New England. Mortality is occurring in some areas of New York and West Virginia, with beech scale levels increasing in Vermont.

Oak Wilt

Oak wilt was widespread in the Lake states and central states in 1988. Mortality is occurring and incidence of the wilt is expected to increase in 1989. Drought is a major factor contributing to the increase.

Scleroderris Canker

New infections and mortality decreased in the northeast and the same is expected for 1989.

DIEBACKS AND DECLINES

The larch resource of Maine, New York and Vermont continued to decline in 1988 with new areas of mortality observed. Eastern larch beetle and drought influenced the situation and an acceleration in the decline is expected in 1989.

Stress conditions continue to cause decline in oaks in several states. Drought, Armillaria and the two lined chestnut borer are affecting oaks in Missouri, the Upper Peninsula of Michigan and West Virginia. The decline decreased in New York and is expected to stabilize in the near future.

Spruce-fir forests in New England, New York and West Virginia continue to decline in association with several biotic and abiotic factors. No new areas of decline were reported in 1988.

Sugar maple decline is still occurring in Maine, New York, and Vermont. Mortality increased in New York, and Vermont experienced widespread dieback. Drought and Stegano sporium sp. are considered contributing factors.

WEATHER

The most severe weather condition that affected the resources of the area was drought. Full impact from the drought is unknown but its effects are expected to be felt for the next two to three years.

CHRISTMAS TREE PESTS

Christmas tree growers throughout the area reported light to moderate damage from Christmas tree pests. There were no major increases in incidence in 1988 and some pest activity is expected to decline in 1989

MAJOR INSECTS

Insect	Host	Location	Remarks
<u>Conifer Sawflies:</u>			
Balsam Shootboring Sawfly <u>Pleroneura</u> <u>brunneicornis</u>	Balsam Fir, Fraser Fir	Maine	Heavy populations and damage were reported in 1988. This is an increase from 1987. It is unknown what will happen to the population in 1989.
		Vermont	Moderate to heavy damage occurred in Christmas tree farms. Early spraying of Diazinon for balsam twig aphid prevented heavier damage to balsam firs. Populations are heaviest in even years so no control is necessary for 1989 but heavy populations could occur in 1990.
European Pine Sawfly <u>Neodiprion</u> <u>sertifer</u>	Red, Pitch, Scots, Shortleaf Pines,	Iowa	Though the intensity of this sawfly varies, its presence is always felt statewide.
		West Virginia	Severity runs from light to heavy and is a threat to Christmas tree plantations and urban areas. Chemical spray is a method of control used by commercial growers.
		Ohio	Several thousand acres have been heavily defoliated with growth losses anticipated. The heavy defoliation is expected to continue in 1989. No control projects are anticipated.
Larch Sawfly <u>Pristiphora</u> <u>erichsonii</u>	Eastern Larch	Maine, New York	Populations are growing in some areas of eastern New York. A long-term problem in New York, larch sawfly has caused light to heavy damage. It has resulted in mortality following drought and beetle attacks. In Maine, frequency

Insect	Host	Location	Remarks
Larch Sawfly (Continued)			of larval sightings has increased steadily over the past few years and this trend is expected to continue in 1989. Though larval sightings were up, defoliation was limited to single trees.
Virginia Pine Sawfly <u>Neodiprion</u> <u>pratti</u>	Shortleaf, Virginia, White Pine	Ohio	This sawfly has been a problem for the past two years and is expected to increase in 1989 if no control measures are taken. Moderate to severe defoliation has been observed with mortality occurring in some areas.
Yellowheaded Spruce Sawfly <u>Pikonema</u> <u>alaskensis</u>	Spruce	Lake States	1988 was the third year of significant defoliation in the Upper Peninsula of Michigan. In Minnesota, infestations are heaviest along roadside trees, but no plantations have been affected.
		Vermont	None observed in 1988 despite reports in previous years.
Eastern Tent Caterpillar <u>Malacosoma</u> <u>americanum</u>	Apple, Ash, Black Cherry, Maple, Oak, Poplar	New England	Populations increased in Massachusetts with over one million acres affected. Defoliation was moderate. Populations are expected to increase in 1989 and no suppression projects are planned for next year. Northern Vermont observed an increase in populations this year while southern Vermont saw lower populations than 1987. Defoliation was light to heavy. Populations were low statewide in Rhode Island for the fifth consecutive year. No suppression projects are planned in 1989.

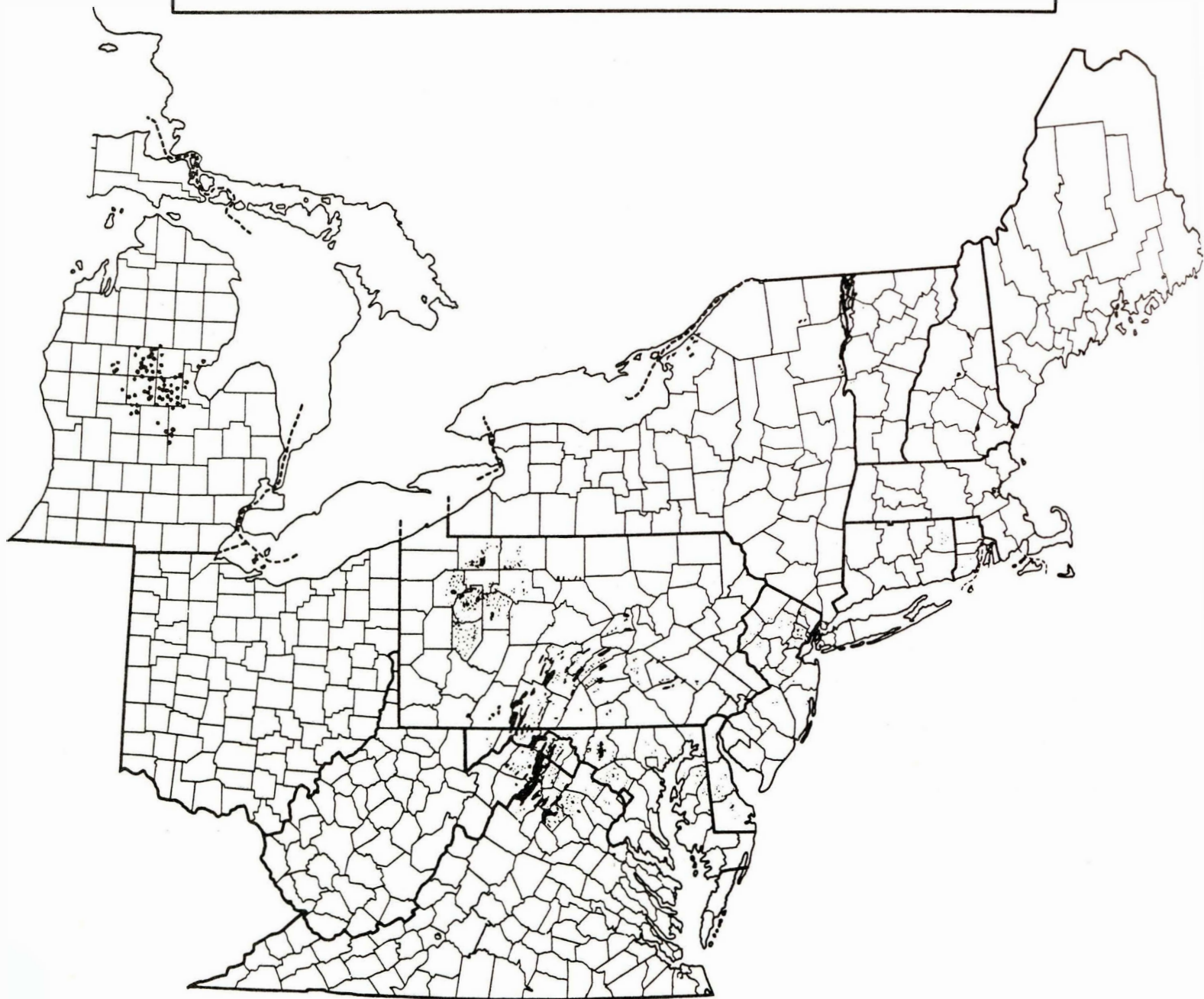
Insect	Host	Location	Remarks
Eastern Tent Caterpillar (Cont)		Illinois	Populations high statewide with complete defoliation of affected trees occurring. Building populations over the past two years are expected to crash in 1989 or fall to low numbers.
		Indiana	Northern quarter of the state observed high population levels. Moderate to heavy defoliation has occurred but looking for a possible population collapse in 1989.
		Missouri	Over three million acres affected with heavy defoliation occurring. Populations have gone from light in 1987 to an expected moderate in 1989. No control projects are planned.
Forest Tent Caterpillar <u>Malacosoma</u> <u>disstria</u>	Aspen, Basswood, Maple, Oak Poplar, White Birch	Lake States	High populations in Wisconsin and Michigan resulted in light to heavy defoliation with some mortality expected in drought areas. <u>Bacillus thuringiensis</u> was sprayed in some areas of Wisconsin but heavy larval populations defoliated trees prior to application, causing poor control results. Some mortality was reported in Minnesota with an increase in population in the northeastern part of the state. Egg mass surveys indicate a continued increase and possible explosion in populations in 1989.
		New England, New York	Populations low and stable in Massachusetts, New York and southern Vermont. Trap collections in Maine showed an increase in populations but no defoliation was observed. Northern Vermont had an increase in larval numbers in 1988 with light defoliation.

Insect	Host	Location	Remarks
Gypsy Moth <u>Lymantria</u> <u>dispar</u> (Table 1, Figure 1)	Oak, Other Hardwoods	Areawide	<p>Vermont and New Hampshire populations continued to build in some areas. Defoliation was detected aerially for the first time in Vermont since 1982, verifying that populations are increasing. Within affected areas, defoliation was moderate to heavy in New Hampshire while light to moderate in Vermont.</p> <p>Massachusetts reported low populations of the insect. While Connecticut's population is increasing, they do not expect to see defoliation in 1989. Rhode Island reported their surveys indicate little potential problem for next year, and populations are decreasing statewide. No control is planned for 1989.</p> <p>In the State of Maine, populations subsided or remained at endemic levels in the southern part of the state. Surveys did not point to any increase of populations in the near future..</p> <p>In New York, Seneca Indian Lands reported a low population for 1988 over the 1300 acres infested with populations decreasing. The aerial application of B.t. showed excellent population reduction and the trend is forecasted as decreasing. Populations decreased in Pennsylvania in 1988. Increasing trends are expected in 1989.</p>

Table 1. Acres of Gypsy Moth Defoliation (1987 and 1988) and Suppression (1988)

State	Acres Defoliated		Acres Suppressed
	1987	1988	1988
Connecticut	65,364	1,639	0
Delaware	2,530	791	43,495
District of Columbia	12	0	5,341
Maine	648	100	0
Massachusetts	28,739	0	0
Maryland	76,803	58,507	166,628
Michigan	39,443	70,350	39,250
New Hampshire	290	1,015	0
New Jersey	95,104	7,430	14,467
New York	55,150	15,700	2,140
Pennsylvania	880,335	312,092	223,894
Rhode Island	5,050	725	0
Vermont	0	703	550
Virginia	67,695	191,000	152,832
West Virginia	12,490	59,250	139,776
Total	1,329,653	719,302	788,373

GYPSY MOTH DEFOLIATED AREAS IN THE USA - 1988



Insect	Host	Location	Remarks
Gypsy Moth (Continued)			<p>Approximately 44,000 acres affected in Delaware with a resurgence in northern parts of the state. New infestations are heavy and defoliation is moderate to severe. Mortality loss is approximately 2.9 million board feet with a stumpage loss of about \$290,000. Populations spreading south through the state. Aerial applications of Dimilin and B.t. on over 44,000 acres gave excellent results.</p> <p>Populations continued to decline in New Jersey for the fourth consecutive year. Less than ten thousand acres were defoliated statewide. Less defoliation was reported in Maryland in 1988 in terms of acreage. Control work planned for 1989 consists of spraying B.t. and Dimilin.</p> <p>72,000 acres of forest land in West Virginia were defoliated in 1988. The amount of mortality has not been determined. The population is expanding and will continue to infest additional acreage. Dimilin was sprayed on over 140,000 acres, with foliage protection achieved on 136,000 acres. The USDA Forest Service AIPM Program is studying infested areas in West Virginia and Virginia.</p> <p>The area of defoliation nearly doubled in Michigan. Mortality is minimal to date, but is expected to increase. B.t. and Dimilin were aerially applied to about 40,000 acres. The area of infestation is expected to increase.</p>

Insect	Host	Location	Remarks
Gypsy Moth (Continued)			<p>Trap catches in Wisconsin increased dramatically from 1987 to 1988. The infestation is located in the eastern part of the state. Trend for 1989 is unknown.</p> <p>In Indiana, moth catches and new locations reporting gypsy moth infestations increased during 1988. Expect moth catch numbers to remain the same in 1989 with a decrease in new locations.</p> <p>An infestation in an 80 acre area is being watched in Iowa. Egg masses, larvae and moths were observed but no defoliation. Observers expect to find additional moths but efforts are under way to eliminate the infestation. Plans call for a B.t. application in 1989. Missouri reported localized infestations but no defoliation.</p> <p>Moths, larvae, and egg masses were observed throughout the State of Ohio in 1988. No noticeable defoliation was reported but with populations building, defoliation is expected to increase during the next few years. No suppression is planned in 1989.</p>
Hemlock Woolly Adelgid <u>Adelges tsugae</u>	Hemlock	New England, New York	<p>In Connecticut defoliation is continuing, with mortality occurring in areas of past defoliation. Excellent population reduction occurred when oil or Malathion was applied. Populations expected to increase in 1989. Small infestations occurred in Rhode Island but little damage was</p>

Insect	Host	Location	Remarks
Hemlock Woolly Adelgid (Continued)			visible and no mortality occurred. All three Rhode Island infestations were brought under control by private efforts. Branch decline and mortality were observed in New York. Dormant oil sprayed to protect foliage. There were no known infestations in Maine but because of the threat of possible infestation, steps have been taken to protect the hemlock resource. Maine, New Hampshire and Vermont have placed an external quarantine against possible adelgid carriers such as hemlock logs, seedlings, chips or bark.
Jack Pine Budworm <u>Choristoneura</u> <u>pinus pinus</u>	Jack Pine	Lake States	Jack pine mortality occurred after defoliation and subsequent Ips spp. attacks in the Upper Peninsula of Michigan. Populations are declining and no increase is expected in 1989. There are small epicenters of defoliation in the Lower Peninsula and observers expect an outbreak in a few years. Minnesota observed light to moderate defoliation and a dramatic decrease in populations. This trend is expected to continue in 1989. Heavy defoliation occurred in Wisconsin but heavy pupal parasitism suggests a decrease in populations in 1989.
Oak Leaf-tier <u>Croesia</u> <u>semipurpurana</u>	Oak	Massachusetts, New Hampshire, Vermont	Moderate to heavy defoliation on over one million acres occurred in Massachusetts with a slow spread of populations from west to east. A pilot spray project using Dimilin has been proposed for 1989. Populations in New Hampshire are fluctuating. Pheromone

Insect	Host	Location	Remarks
Oak Leaf-tier (Continued)			trap catches increased in 1988 but no defoliation was observed in an aerial survey. Populations are expected to increase in 1989 because of the heavy population across the New Hampshire border in Massachusetts. Trap monitoring, aerial surveys and egg surveys are planned for 1989.
Pear Thrips <u>Taeniothrips</u> <u>inconsequens</u>	Sugar Maple	New England, New York, Pennsylvania	Massachusetts and Vermont were hardest hit in New England with defoliation ranging from light to heavy. Approximately 2 million acres were affected in Massachusetts and population levels appear to be increasing and moving west to east. Populations in Vermont went from low levels in 1987 to very high in 1988. Defoliation covered approximately 470,000 acres and was severe with dry weather increasing symptom severity. Red maple, black cherry, white ash, yellow birch and American beech were affected along with sugar maple. Twig and branch mortality was evident with the fungus <u>Steganothrips</u> <u>sp.</u> commonly associated with the mortality. A Governor's Technical Task Force on Pear Thrips has been established to study the problem. In New York the pest was first found in 1985, populations rose in 1988 after subsiding in 1986 and 1987. Though population density increased, damage was only spotty. Thrips will be watched in 1989 to see if the increase continues. Rhode Island had reports of pear thrips but no actual

Insect	Host	Location	Remarks
Pear Thrips (Continued)			confirmation. No damage was observed but surveys for the insect will continue in 1989. Symptoms of pear thrips damage was observed in northwestern Connecticut but presence of the insect was unconfirmed. Maine observed scattered thrips in maple buds but found no damage. Because of west to east migration the state will be following the insect closely in 1989. Populations in New Hampshire are concentrated in the western and southwestern portions of the state and spotty elsewhere. No obvious damage was reported. Some private landowners, with State assistance, aerially treated with Sevin. Pennsylvania, where thrips damage was first observed in 1979, observed a population increase in 1988 especially in northern areas of the state. About 1.3 million acres were affected and thrips defoliation contributed to sugar maple decline. No control projects are in place but sugarbush operators have been advised to tap only vigorous trees in 1989.
Red Pine Adelgid <u>Pineus borneri</u>	Red Pine	Connecticut, Massachusetts	Populations in Massachusetts continue to be low with defoliation being light. Conditions haven't changed over the last three years and no increase is expected next year. Connecticut continues to see high adelgid populations with mortality occurring statewide.

Insect	Host	Location	Remarks
Saddled Prominent <u>Heterocampa</u> <u>guttivitta</u>	Sugar Maple	Maine, Vermont	No defoliation observed in 1988 in Maine. Populations remained at 1987 levels and no increase is expected in 1989. Vermont populations increased with light defoliation observed. Egg surveys are planned in areas of concern for 1989.
Spruce Beetle <u>Dendroctonus</u> <u>rufipennis</u>	Black, Red, White Spruce	Maine, New York	Spruce beetle was observed in budworm damaged stands in Maine. Approximately 75 percent of trees in infested areas have been killed. Size and severity of infestation is increasing and new areas are being identified in aerial surveys. Infestations in New York continue to run from light to heavy with mortality occurring in some areas.
Spruce Budworm <u>Choristoneura</u> <u>fumiferana</u>	Balsam Fir, White Spruce	Maine, Michigan, Minnesota, New Hampshire, Vermont	Pheromone trapping in New Hampshire and Vermont showed continued low, stable populations. Michigan observed low populations. Approximately 200,000 acres in northeastern Minnesota were affected by budworm but this was a 60 percent overall decrease. Infestation in Maine remained at low levels in 1988. Total defoliated area is an estimated 65,000 acres. Mortality is still occurring but mostly due to secondary factors. Size and intensity of infestation is expected to continue to decrease.
Two-lined Chestnut Borer <u>Agrilus</u> <u>bilineatus</u>	Oaks	Minnesota, Wisconsin	Approximately 1.5 million acres were affected in Minnesota. Infestations for 1989 are expected to stay at current rates due to the drought. A large increase in

Insect	Host	Location	Remarks
Two-lined Chestnut Borer (Continued)			populations occurred in Wisconsin with scattered mortality statewide. Salvage logging is occurring in some infested areas. Future trends are not predictable.
Walnut Caterpillar <u>Datana</u> <u>integerrima</u>	Walnut	Illinois	Northern two thirds of Illinois affected, with defoliation moderate to heavy. Combined effects of defoliation and drought could weaken trees making them susceptible to secondary insect pests in 1989.
White Pine Weevil <u>Pissodes</u> <u>strobi</u>	Jack Pine, Scotch Pine, White Pine, Blue, Norway, Red, White Spruce	Maine, Michigan, New York, Rhode Island, Vermont	The white pine weevil is a major pest of Jack Pine in Michigan with over 3,000 acres affected, but volume losses are difficult to predict. Problem with this insect is expected to continue in 1989. The most serious insect pest of white pine in Maine, weevil damage is present on approximately 25 percent of plantation white pine. Volume loss is significant but more important is loss in grade due to stem deformation. Incidence has been high the past few years and is expected to continue in the future. Some treatment being done by private sector using Metasystox R, lindane and methoxychlor. Efficacy trials are planned for 1989. Infestations ranging from low to moderate are present in New York, Rhode Island, and Vermont, and expected to continue in the future.

MAJOR DISEASES

Disease	Host	Location	Remarks
Anthracnose <u>Gloeosporium</u> <u>spp.</u>	Maple, Sycamore, Other Hardwoods	Connecticut, Indiana, Missouri, Pennsylvania, Vermont, West Virginia	<p>In Indiana defoliation was moderate to heavy statewide. Unusual crown symptoms were exhibited, with lower crowns developing normally and crown tops suffering dieback. A prolonged period of cool/wet weather during bud break caused an increase in anthracnose incidence in Pennsylvania. Moderate to severe defoliation was reported. Sycamore anthracnose was severe in Missouri with trees exhibiting as much as 75 percent defoliation. Damage is expected to continue. The disease was also reported in western Connecticut. Vermont observed traces of anthracnose on sugar maple at high elevations but incidence was down from 1987. Anthracnose incidence increased in 1988 in West Virginia and was at moderate to severe levels. Hardwoods along river drainages sustained the most damage.</p>
Ash Yellows (Ash Dieback)	Green Ash, White Ash	New York, Vermont Indiana	<p>Ash yellows, caused by a mycoplasma-like organism, continues to be observed in New York and Vermont with associated ash dieback. This dieback is responsible for tree mortality in New York.</p> <p>Northern one-third of the state exhibiting ash dieback symptoms with 50 percent of that having ash yellows.</p>

Disease	Host	Location	Remarks
Ash Yellows (Continued)		Iowa	Ash yellows continues to increase in Iowa. Damage ranges from light to heavy in timber size classes. Because trees seem to maintain soundness several years after death, salvage operations are continuing.
		Minnesota	This is the first report of ash yellows in Minnesota. Advanced stages of dieback and mortality have been observed.
		Missouri	1988 was the first year ash yellows was detected in Missouri. Extensive dieback symptoms were observed in affected trees but no mortality has been reported. Only white ash has been affected and ash yellows is expected to increase in 1989.
		Ohio, Pennsylvania	Decline of ash continues with scattered dieback and mortality occurring. Both states expect an increase in ash yellows along with an increase in mortality.
Beech Bark Disease <u>Nectria coccinea</u> var. <u>faginata</u>	American Beech	New England, New York	Mortality and dieback due to beech bark disease continues to occur throughout New England. The disease is building in intensity in western New York while levels remain low in the eastern part of the state. Mortality is high in the Adirondacks and Catskills. The disease continues to be observed in southern Vermont but at levels lower than 1987, while northern Vermont observed an increase in the disease. Beech scale levels have increased in all areas of the state.
Beech Scale <u>Cryptococcus</u> <u>fagisuga</u>			

Disease	Host	Location	Remarks
Beech Bark Disease (Continued)		Pennsylvania, West Virginia	Beech bark disease continued to increase in 1988 along with beech scale populations. Light to moderate mortality has been observed with approximately 466,000 MBF being affected in the two states including the Monongahela National Forest. The disease is expected to continue its spread in 1989 with an increase in mortality.
Dogwood Anthracnose <u>Discula spp.</u>	Dogwood	Maryland, New York	Severe mortality occurred in Maryland with an approximate increase of 80 percent since 1984. Mortality is expected to continue. Fungicide applications to control leaf infections have been successful when used on a small basis. Anthracnose is on the increase in southeastern New York, slowly eliminating dogwoods in this area.
European Larch Canker <u>Lachnellula</u> <u>willkommii</u>	Eastern Larch	Maine	Infection confined to coastal regions of the state but expected to spread. Infection at two epicenters is heavy, with light to moderate incidence elsewhere. Mortality continued to occur only on sapling-pole sized trees. State and Federal quarantines are in effect and being enforced. 1988 surveys showed no spread of the disease into new townships so quarantine boundaries are the same as those of 1987.
Oak Wilt <u>Ceratocystis</u> <u>fagacearum</u>	Oak	Indiana	An annual problem statewide in Indiana with small amounts of mortality occurring. Mortality is expected to continue with possibility of increase in disease incidence due to drought effects.

Disease	Host	Location	Remarks
Oak Wilt (Continued)		Iowa	The disease showed a significant increase over 1987, with severity ranging from light to heavy defoliation, probably due to drought. Expected to increase for the next few years.
		Lake States	Approximately two million acres affected in Minnesota with an increase in the metro region. A small increase in the numbers of epicenters was observed throughout northern Michigan.
			Still present in Wisconsin but no new areas located. Control methods such as vibratory plow lines are being used but increases are still expected. Drought is a major factor in the increase.
		West Virginia	Still present in the state but at low levels.
Scleroderris Canker <u>Ascoalyx</u> <u>abietina</u>	Red, Scotch, Jack Pine	Maine, New York, Vermont	Scattered infections observed in Maine but no mortality reported. New infections and mortality decreased statewide in New York and Vermont and the same is expected for 1989.
		Upper Peninsula of Michigan	Scattered pockets of branch flagging observed but no new infections or tree mortality occurred.
White Pine Blister Rust <u>Cronartium</u> <u>ribicola</u>	White Pine	Iowa, Maine, Vermont	Presently a problem only in the northeastern part of Iowa. Significant increase in severity in 1988 compared to previous years. Will continue to be present but climatic conditions will help determine the intensity of the spread. Occurrence in Maine is statewide with annual losses

Disease	Host	Location	Remarks

White Pine Blister Rust (Continued)			running between \$60,000 and \$100,000. Small acreages under intense control using Tordon RTU while larger areas are under cursory control. Vermont observed few new infections and there was no change in mortality rates from 1987 to 1988.

DECLINES AND DIEBACKS

Decline/Dieback	Host	Location	Remarks
Birch Dieback	White Birch	Maine, Vermont	Primarily affecting white birch in the western portion of Maine with scattered defoliation. Whole crown dieback appears to be stabilizing though the 1988 drought increased twig dieback. Present in Vermont especially at higher elevations. Increasing in southern part of the state. Ambrosia beetle found in association with declining birch.
Larch Decline	Larch	Maine, New York, Vermont	Larch decline associated with bark beetle continues in Maine. Serious problem in view of plans to establish extensive planting of larch statewide. New spots of beetle presence and mortality occurred in northern areas in 1988. Some salvage is being conducted. Decline increased in New York after low incidence for past two years. Moderate mortality occurred with Eastern larch beetle playing a role. Expect an increase in 1989. Decline increased in Vermont with both drought and beetle influencing the situation. Expected to accelerate over the next year or two.
Oak Decline	Red Oak	Missouri, New York, Upper Peninsula of Michigan, West Virginia	Approximately quarter of a million acres affected in Missouri. Stress system including drought, Armillaria root rot and two-lined chestnut borer causing severe decline. Accumulated loss of \$60 an acre for 15 years. Expected to continue in 1989. Similar stress conditions

Decline/Dieback	Host	Location	Remarks

Oak Decline (Continued)			prevailed in the Upper Peninsula and decline is expected to continue in 1989. Oak decline followed heavy gypsy moth defoliation in New York in the early eighties and is beginning to stabilize. Serious problem in West Virginia induced by drought and insect defoliation. Pockets of mortality beginning to appear.
Spruce-Fir Decline	Balsam Fir, Red Spruce	Maine, Massachusetts, New Hampshire, New York, Vermont, West Virginia	Red spruce and Balsam fir in these states continued to show decline and mortality. No new major areas of decline observed. Factors contributing to the decline include: many biotic factors such as spruce beetle, eastern dwarf mistletoe; weather related factors; and other undetermined factors.
Sugar Maple Decline	Sugar Maple	Maine, New York, Vermont	In Maine, no known areas of unexplained dieback or mortality have been observed. Site related and insect-caused problems have been noted. Approximately 125,000 acres affected in New York. Mortality increasing within declining areas. Effects of drought as yet undetermined. Branch dieback widespread throughout the state of Vermont. Dieback occurred mostly in lower crowns. Contributing factors to the problem were drought and <u>Stegano sporium</u> , an opportunistic fungus.

WEATHER

Condition	Host	Location	Remarks
Drought	Conifers Hardwoods	All States	The drought of 1988 was the one weather factor that impacted the entire area. Drought damage was reported from tree nurseries to mature timber stands. Trees have now been predisposed to insect and disease attack for the next two to three years. Damage is expected to be severe in some areas during 1989 if adequate rainfall does not occur in the spring.

OZONE

Condition	Host	Location	Remarks
Ozone	Both conifers and hardwoods	New Hampshire, Rhode Island, Vermont	Ozone levels were high in New England during the summer of 1988 with Vermont measuring the highest levels ever recorded in that state. Symptoms of light to moderate damage occurred on black cherry, white ash, white pine and several shrubs. Rhode Island observed pockets of needle spotting and expects the problem to increase. As part of a Federal Program, monitoring has begun in wilderness areas on the Green Mountain and White Mountain National Forests.

CHRISTMAS TREE PESTS

Insect/Disease	Host	Location	Remarks
Balsam Gall Midge <u>Paradiplosis</u> <u>tumifex</u>	Balsam Fir	Vermont	Moderate to heavy Christmas tree damage observed. Populations expected to increase in 1989 especially in northern areas of the state where occurrence of the midge is widespread.
Balsam Twig Aphid <u>Mindarus</u> <u>abietinus</u>	Balsam Fir	Vermont	Light to moderate damage similar to 1987 damage.
European Pine Sawfly <u>Neodiprion</u> <u>sertifer</u>	Scotch Pine	Illinois	Populations in 1988 were light to moderate, dropping from the high levels of 1987. Control measures taken that year were probably responsible for the decrease. No trend for 1989 was reported.
Nantucket Pine Tip Moth <u>Rhyacionia</u> <u>frustrana</u>	Pines	Missouri	Native to Missouri, this insect has an apparent ten year cycle. Populations in 1988 were moderate to heavy but if the trend of the past couple of decades holds, a collapse is expected in 1989.
Western Gall Rust <u>Endocronartium</u> <u>harknessii</u>	Ponderosa, Scotch Pine	Missouri	Low infestation levels were reported in 1988 and no increase is expected in 1989. All infected trees are destroyed when found.
Other Christmas Tree Pests	Various Species	Vermont	Minor infestations caused by various insects, Allegheny Mound Ant, <u>Formica</u> <u>exsectoides</u> , Cooley Spruce Gall Adelgid, <u>Adelges cooleyi</u> , Eastern Spruce Gall Adelgid, <u>Adelges abietis</u> , Pine Bark Aphid, <u>Pineus strobi</u> , and Spruce Spider Mite, <u>Oligonychus ununguis</u> have been observed in some Christmas tree plantations. Also observed causing light to

Insect/Disease	Host	Location	Remarks

Other Christmas Tree Pests (Continued)			<p>moderate damage were</p> <p>Cyclaneusma Needlecast,</p> <p><u>Cyclaneusma minus</u>, Fir Fern</p> <p>Rust, <u>Uredinopsis mirabilis</u>,</p> <p>Lophodermium Needlecast,</p> <p><u>Lophodermium seditiosuni</u>,</p> <p>Rhabdocline Needlecast,</p> <p><u>Rhabdocline pseudotsugae</u> and</p> <p>Swiss Needlecast,</p> <p><u>Phaeocryptopus gaumani</u>.</p>

OTHER INSECTS

Insects	Host	Location	Remarks
Aphids	Sugar Maple	Vermont	Common on sugar maple throughout the region. Some heavily infested trees suffered no apparent damage while others suffered leaf yellowing or premature leaf drop.
<u>Periphyllus americanus</u>			
<u>Periphyllus lyropictus</u>			
<u>Periphyllus testudinacea</u>			
Balsam Woolly Adelgid	Balsam Fir	Vermont	Light populations present after several years of absence.
<u>Adelges piceae</u>			
Basswood Thrips	Basswood	New York, Wisconsin	Damage is severe in some areas of New York. 1989 trend cannot be predicted due to lack of experience with the insect. Wisconsin observed a decrease in basswood thrips populations in the northeast but northwestern areas saw an increase. Impact of defoliation being determined by DNR and University of Wisconsin, and the USDA Forest Service.
<u>Thrips calcaratus</u>			
Birch Casebearer	White Birch	Maine	Northern two thirds of the state affected. Scattered spots of defoliation noticeable with an increase in top dieback and tree mortality in old infestations. Increased degrade due to previous heavy defoliation. Statewide population is stable with no appreciable defoliation expected in 1989.
<u>Coleophora serratella</u>			
Birch Leaf Miner	Gray, Paper, Yellow Birch	Maine, Vermont, Wisconsin	Populations and damage heavy in Maine and more widespread than in 1987. Moderate to heavy defoliation occurred in northern Vermont while southern Vermont saw a decrease in defoliation from 1987. Approximately 800 acres impacted in Wisconsin; no treatments planned in 1989.
<u>Fenusa pusilla</u>			

Insect	Host	Location	Remarks
Browntail Moth <u>Euproctis</u> <u>chrysorrhoea</u>	Cherry, Oaks, Roses, Rubus, Willow	Maine, Massachusetts	Low level infestation with light defoliation occurring on off-shore islands. Populations increasing; possible threat to mainland. Slight increase in populations with moderate defoliation occurring. Major concern is dune erosion due to tree mortality. B.t. applied on local level but no state or federal programs planned.
Bruce Spanworm <u>Operophtera</u> <u>bruceata</u>	Sugar Maple	Vermont	Larval sightings made and light defoliation occurred. None had been reported in 1987.
Conifer Swift Moth <u>Korsheltellus</u> <u>gracilis</u>	Balsam Fir, Red Spruce	New Hampshire, New York, Vermont	Found in association with feeding wounds on the roots of balsam fir and red spruce at high elevations. Occurring in northern areas of the states.
Evergreen Bagworm <u>Thyridopteryx</u> <u>ephemeraeformis</u>	Evergreens, Locust, Maple, White Pine	Indiana, Ohio	Defoliation ran light to heavy in Indiana. Increasing problem since 1986 with possibility of increase in 1989 if no control measures are taken. B.t. sprayed on federal lands from backpack and mist blowers.
Fall Cankerworm <u>Alsophila</u> <u>pometaria</u>	Ash, Beech, Cherry, Hickory, Maple, Oak, Yellow Birch	Indiana, Maine, Maryland, Massachusetts, New York, Ohio, Rhode Island, Wisconsin	Light to heavy defoliation in Indiana with the same expected in 1989. Fall cankerworm found in association with spring cankerworm and linden looper. Light populations observed in Maine and Rhode Island but no defoliation reported. Massachusetts, New York, and Ohio observed high populations and heavy defoliation with expected increases in 1989. An increase occurred in Wisconsin also but populations expected to decrease in 1989. Defoliation decreased significantly in Maryland

Insect	Host	Location	Remarks
Fall Cankerworm (Continued)			during 1988. Approximately 3,000 acres defoliated dropping from 36,000 acres in 1984.
Fall Hardwood Defoliation Complex About 25 Species	Beech, Birch, Maple, Various Hardwoods	Maine	Defoliation was more severe in 1988 than in previous years. Populations were heavy and are expected to continue in 1989. Predominant species were variable oak leaf caterpillar (<u>Lochmaeus manteo</u>), Orange-humped mapleworm (<u>Symmerista leucitys</u>), and Birch sawfly (<u>Arge pectoralis</u>).
Fall Webworm <u>Hyphantria</u> <u>cunea</u>	Various Hardwood Species	Indiana, Maine, Missouri Rhode Island, Vermont	Populations collapsed in Indiana during 1988. Light defoliation and webbing reported. No defoliation is expected in 1989 with webs per tree low and scattered. Maine observed heavy populations, moderate defoliation, and scattered mortality. Possibility of another heavy season in 1989. Light to moderate defoliation occurred over 1.3 million acres in Missouri. Same is expected for 1989. Vermont reported light but increasing populations while Rhode Island observed a light and stable population.
Hemlock Looper <u>Lambdina</u> <u>fiscellaria</u>	Various Softwoods & Hardwoods	Maine	Though no defoliation reported, larval sightings were made and moths were abundant in spruce budworm pheromone traps. Winter surveys to be conducted.
Lecanium Scale <u>Lecanium sp.</u>	Black Locust, Maple, Oak	Vermont	Southern Vermont observed heavy infestations in sugarbushes but impact is unknown. Populations heavy on ornamental oaks in northern Vermont but lighter than 1987 in other locations.

Insect	Host	Location	Remarks
Maple Trumpet Skeletonizer <u>Epinotia</u> <u>aceriella</u>	Sugar Maple	New York, Vermont	Populations increasing in both states and causing light defoliation. Potential threat to sugarbush growers in New York.
Orange-Striped Oakworm <u>Anisota</u> <u>senatoria</u>	Various Oaks	Rhode Island	Approximately 11,000 acres affected. Low level defoliation. Infested area decreased in size after four years of expanding.
Oystershell Scale <u>Lepidosaphes</u> <u>ulmi</u>	Beech, Maple, Poplar	Indiana, New York, Vermont	Caused dieback and twig mortality in all locations. Populations light in Indiana and Vermont but increasing in New York.
Pales Weevil <u>Hylobius pales</u>	Red Pine	New York	Affecting seedlings in central New York. Approaching \$5,000 worth of damage based on replanting and site preparation costs. Weevil habitat reduced greatly by slash reduction.
Pine False Webworm <u>Acantholyda</u> <u>erythrocephala</u>	Various Pines	New York	Severe, persistent problem for the past several years. Many host trees dead. Defoliation moderate to severe in 1988 and spreading eastward and southward.
Pine Needleminer <u>Exoteleia</u> <u>pinifoliella</u>	Pitch Pine	New York	High publicity problem in New York. Level of defoliation was highest on record. Major discoloration occurred followed by significant defoliation. Future trend unknown.
Red Pine Scale <u>Matsucoccus</u> <u>resinosae</u>	Red Pine	New York	Severe problem in southeastern New York. Damage was heavy with mortality occurring in previously infested areas. Range is increasing.

Insect	Host	Location	Remarks
Scolytid Beetle <u>Pityophthorus</u> <u>sp.</u>	White Pine	New York	First year of noticeable damage. Twig tips infested in a five thousand acre area. No estimates of mortality available.
Spearmarked Black Moth <u>Rheumaptera</u> <u>hastata</u>	Birch	Maine	Defoliation very heavy and noticeable in North central part of the state. First time this insect has been in such abundance in Maine.
Yellownecked Caterpillar <u>Datana ministra</u>	Oak	Illinois	Severe defoliation throughout central Illinois. Expect tree loss in 1989 due to severe drought and defoliation.
Yellow Poplar Weevil <u>Odontopus</u> <u>calceatus</u>	Elm, Sassafras, Tuliptree, Yellow Poplar	Indiana, Ohio	Light to moderate defoliation in Indiana. Decrease from 1987. Light defoliation expected to continue in 1989. Second year of infestation. Several thousand acres affected. Heavy browning of tips with some defoliation occurring. Expecting one more year of heavy defoliation before population declines.

OTHER DISEASES

Disease	Host	Location	Remarks
Caliciopsis Canker <u>Caliciopsis</u> <u>pineae</u>	White Pine	Vermont	Present in northern Vermont with new infections occurring in 1988. Heavy resin flow on infected trees resembles white pine blister rust. Crowns appear unhealthy but no mortality observed.
Cytospora Canker <u>Valsa kunzei</u> (<u>Cytospora</u> <u>kunzei</u>)	Blue, Norway and Red Spruce	West Virginia	Common disease occurring throughout the state. Most common on Norway spruce it has become common on native red spruce stands.
Diplodia Tip Blight <u>Sphaeropsis</u> <u>sapinea</u>	Austrian, Red, and Scotch Pine	Indiana, Iowa, Massachusetts, Minnesota, New York, Rhode Island, Vermont, West Virginia, Wisconsin	Light damage in Indiana the past few years with the same expected in 1989. Rhode Island and Vermont observed spotty Diplodia tip blight occurrence in 1988 with incidence low and no increase predicted for 1989. All other areas reported an increase in incidence with light to heavy infections. Diplodia tip blight is a major problem on host species and is expected to continue to spread in 1989. Pine mortality is common in southeastern New York. Infected areas are expected to increase in 1989 in Massachusetts and Minnesota. Wisconsin observed a high incidence in 1988 and expects the disease to advance in infected trees. Spread to healthy trees is not expected.
Dutch Elm Disease <u>Ceratocystis</u> <u>ulmi</u>	American Elm	Indiana	Very evident in 1988 compared to prior years. Mortality was observed. Expected to be more evident in 1989 as drought influences become more apparent.

Disease	Host	Location	Remarks
Dutch Elm Disease (Continued)		Ohio, Vermont, West Virginia	Scattered statewide through Ohio, Dutch Elm Disease caused a great deal of mortality in 1988. Severity in 1988 could have been due to drought conditions. Expected to continue in 1989. A greater than usual amount of mortality due to Dutch Elm Disease occurred in Vermont in 1988. An aggressive strain of the fungus has become more abundant in the state causing the increase in mortality. Expected to continue in 1989. Incidence of disease was high throughout West Virginia this year. Considered to be the single most important forest and shade tree problem in the state.
Hypoxylon Canker <u>Hypoxylon</u> <u>atropunctatum</u>	Oaks	West Virginia	Increased in incidence during 1988. Probably due to increase in dead and dying timber brought on by drought and defoliation.
Pinewood Nematode <u>Bursaphelenchus</u> <u>xylophilus</u>	Austria, Jack, Japanese Black, Scotch, and White Pine	Maine, Missouri, New York, West Virginia	Found and confirmed on balsam fir at two locations in 1988. Confirmed on only pine previously. Economic losses of up to \$10,000 occurred in Missouri. Epidemic on scotch pine. Problem expected to increase in 1989 due to 1988 drought. Dramatic increase in mortality in southeastern New York and expected to increase in 1989. State tree nursery discontinued shipment of Japanese black pine because of its inability to survive. Detected in West Virginia Christmas tree plantation for the first time. Trees stressed by drought were most susceptible.

Disease	Host	Location	Remarks
Sapstreak <u>Ceratocystis</u> <u>coerulescens</u>	Sugar Maple	Vermont	Present again in northern Vermont especially in sugarbushes and maple stands.
Stegansporium <u>Steganosporium</u> <u>Spp.</u>	Sugar Maple	Vermont	Extremely abundant in association with current branch and twig dieback. Trees predisposed by pear thrips could be subject to attacks by this opportunistic fungus.
Stillwell's Syndrome	Balsam Fir	Maine	The balsam fir mortality is associated with Armillaria root rot in areas of prior spruce budworm defoliation. There has ben an increase in occurrence since 1987 but it is not as severe as 1984-86 levels. The mortality is expected to continue for several years.